ABSTRACT

Methods for detecting the presence or absence of ice or liquid water on surfaces are provided. In a first embodiment of the invention, a reflectance spectrum from a surface to be tested is measured using any suitable near-infrared optical system. The midpoint wavelength of the transition or step of the measured reflectance spectrum near 1.4 microns is calculated, and compared to a decision threshold wavelength. If the midpoint wavelength is less than the decision threshold wavelength, the presence of liquid water on the surface is indicated. If the midpoint wavelength is greater than the decision threshold wavelength, the presence of ice is indicated on the surface. In a second embodiment of the invention, at least three reflectance levels are measured at three wavelengths, and a dimensionless decision function is applied to the measured reflectance levels. Output of the decision function is compared to at least two pre-defined ranges. If the output is within a first range, the presence of liquid water on the surface is indicated. If the output is within a second range, the presence of ice on the surface is indicated. If the output is between the pre-defined ranges, the absence of ice or water on the surface is indicated.

822385